

# Specific Protein Tyrosine Phosphatase Inhibitor for Cancer

## TECHNICAL FIELD

Therapeutic: Phosphatase Inhibitor as therapeutic agent for cancer treatment (2007-0514)

## BACKGROUND

Eyes absent (EYA) and sinu oculis homeobox (SIX) proteins are members of a regulatory cascade involved in cell-fate determination during normal organ development, that are aberrantly over expressed in breast cancer tissue.

The EYA proteins (EYA1-4) have dual biochemical function – transactivators and tyrosine phosphatase activity. The SIX proteins (SIX1-6) are transcription factors that can act as activators or repressors of transcription based on their cellular partners. Specific SIX and EYA proteins can regulate each other synergistically to increase cell proliferation and migration in breast cancer.



## TECHNOLOGY

Many protein tyrosine phosphatase (PTPs) are over-expressed in breast cancer. They are believed to dephosphorylate and activate the oncogenic protein tyrosine kinase (PTK) *c-src* which accounts for 70% of the elevated PTK activity in breast cancer. Thus PTPs are emerging as important new targets for cancer therapy.

The design of PTP inhibitors has been challenging because they often share a common reaction mechanism utilizing a conserved Cysteine as well as other features of the active site. The EYA family of PTPs act by a distinct mechanism using an Aspartate as a nucleophile. Hence they serve as an attractive new target specific to breast cancer and possibly to other cancer too.

A number of potential PTP inhibitors (inhibiting greater than 80% and some of them inhibiting greater than 90%) has been identified which will serve as a great therapeutic agent for breast cancer.

## APPLICATIONS

1. Therapy for breast cancer & other cancer
2. Research tool

## ADVANTAGES

- Specific PTP inhibitor

## INVESTIGATOR

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## STATUS

Patent Pending

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# Specific Protein Tyrosine Phosphatase Inhibitor for Cancer



Center for Technology Commercialization

## THE INVENTOR

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## BACKGROUND

Dr. Hegde is tenured Associate Professor in the Department of Pediatrics, University of Cincinnati and Division of Developmental Biology at Childrens Hospital Research Foundation.

### Research Interest:

Molecular mechanisms underlying early stages in embryonic organ development, molecular basis of developmental defects and cancer, protein-DNA interactions, X-ray crystallography

### Recent Publications

Zhang Y, Xi A, Hegde RS, Shakked Z, Crothers DM. (2004) **Predicting indirect readout effects in protein-DNA interactions.** *Proceedings of the National Academy of Sciences* 101(22):8337-41.

Wilson J, Malakhova M, Zhang RG, Joachimiak A, Hegde RS. (2004) **Crystal structure of the Dachshund-homology domain of human SKI.** *Structure* 12(5):785-792

Tan M, Hegde RS, Jiang J. (2004) **The P domain of norovirus capsid protein forms a dimer and binds to histo-blood group antigen receptor.** *Journal of Virology* 78(12):6233-42

Rayapureddi JP, Kattamuri C, Chan FH, Hegde RS. (2005) **Characterization of a plant, tyrosine-specific phosphatase of the aspartyl class.** *Biochemistry* 44(2):751-8